

PATENT ABSTRACTS OF JAPAN

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(54) SEALING MATERIAL FOR PHOTOCATALYST LAYER-HAVING TRANSPARENT MATERIAL

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a sealing material jointly used with a transparent material such as a glass, whose surface is subjected to stain-proof treatment with a photocatalyst layer, staining no material to be sealed and preventing itself from being deteriorated.

SOLUTION: The sealing material is jointly used with the transparent material whose surface comprises a layer having a stain-proof property resulting from a photocatalyst, and is composed of a reactive silicon group-having acrylic or saturated hydrocarbon-based polymer.

LEGAL STATUS

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CLAIMS

[Claim (a)]

[Claim 1]

The sealing material characterized by consisting of a polymer of the acrylic which is the sealing material used for a front face combining the transparent material in which the layer which has an antifouling operation is prepared, and has a reactant silicon radical, or a saturated hydrocarbon system.

[Claim 2]

The sealing material according to claim 1 whose layer which has an antifouling operation is a layer which has the antifouling operation by the photocatalyst.

[Claim 3]

The sealing material according to claim 1 to 2 whose transparent material is glass.

[Claim 4]

The sealing material according to claim 1 to 3 whose transparent material is a building material.

[Claim 5]

The sealing material according to claim 1 to 4 characterized by including the plasticizer which has an acrylic component as a sealing material's constituent.

[Claim 6]

The sealing material according to claim 1 to 5 characterized by including the compound which has three -COOCH(s) as a sealing material's constituent.

[Claim 7]

The sealing material according to claim 1 to 6 which is the polymer which has the monomeric unit to which the polymer of the acrylic which has a reactant silicon radical, or a saturated hydrocarbon system originates in the monomer which has three -COOCH(s).

[Claim 8]

The ceiling method using the sealing material which consists of a polymer of the acrylic which is the ceiling method of a transparent material with which the layer which has the antifouling operation by the photocatalyst is prepared in the front face, and has a reactant silicon radical, or a saturated hydrocarbon system.

[Claim 9]

The ceiling method according to claim 8 whose transparent material is glass.

[Claim 10]

The ceiling method according to claim 8 to 9 whose transparent material is a building material.

[Claim 11]

The ingredient with which the layer which has the antifouling operation by photocatalyst operation on a front face has a photocatalyst operation, and the ceiling method according to claim 8 to 10 it is [ceiling method] the layer in which a hydrophilic ingredient is included further.

[Claim 12]

The ceiling method according to claim 8 to 11 characterized by including the plasticizer which has an acrylic component as a sealing material's constituent.

[Claim 13]

The ceiling method according to claim 8 to 12 characterized by including the compound which has three -COOCH(s) as a sealing material's constituent.

[Claim 14]

The ceiling method according to claim 8 to 13 which is the polymer which has the monomeric unit to which the polymer of the acrylic which has a reactant silicon radical, or a saturated hydrocarbon system originates in the monomer which has three -COOCH(s).

[Claim 15]

The ceiling method according to claim 8 to 14 characterized by applying the primer of a silicone system to the seal part of a transparent material.

[Claim 16]

The transparent material which was obtained by the approach according to claim 8 to 15 and by which sealing was carried out.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[Field of the Invention]

[0001]

This invention relates to the sealing material (both the sealing material of the solid-state of a predetermined configuration beforehand fabricated as a sealing material and a liquefied sealing material are included) which uses for the transparent material of low stain resistance.

[Background of the Invention]

[0002]

A room-temperature-curing nature polymer is liquefied before hardening, and after hardening serves as a rubber-like object and is used as a sealing material. Sealing materials, such as an urethane system, a silicone system, a conversion silicone system, and a polysulfide system, are known by the typical room-temperature-curing nature sealing material. Although a sealing material is used to various ingredients including building materials, such as glass, a metal, and a stone, since light reaches through glass at the interface of glass and a sealing material in the case of transparent materials, such as glass, it will deteriorate, if a sealing material's weatherability is small, and exfoliation occurs in the interface of glass and a sealing material. For this reason, the silicone system sealing material which is excellent in weatherability is used for sealing materials of a transparent material, such as glass. However, a silicone system sealing material has the problem of silicon compounds, such as silicone oil, oozing out and polluting the charge of a sealing material from the interior.

[0003]

In order to solve the problem resulting from the above-mentioned silicone system sealing material, the approach using sealing materials of a non-silicone system, such as a polyisobutylene system sealing material which changes to a silicone system sealing material and has a conversion silicone system sealing material and a reactant silicon radical, is indicated (patent reference 1). It is indicated by the patent reference 1 that the polyisobutylene system sealing material which has a reactant silicon radical can use it as a sealing material of transparent materials, such as a glass ingredient.

[0004]

Recently, the layer which has a photocatalyst operation is prepared in the front face of ingredients, such as a building material, and the approach of giving an antifouling function to a front face is developed. If a silicone system sealing material is used as a sealing material of such a building material, it not only cannot prevent contamination resulting from a silicone system sealing material, but it is said that the antifouling function itself is reduced.

[0005]

However, unlike a silicone system, if a non-silicone organic macromolecule system sealing material is used for transparent materials, such as glass with which the layer which has a photocatalyst operation was prepared, since such a sealing material is the typical organic substance, he will tend to deteriorate by the light which is inferior to stability and enters through a transparent material from a silicone system sealing material. If it is moreover used for the ingredient which has a photocatalyst operation, degradation of the sealing material by the

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oxidizing substance generated according to a photocatalyst operation will be added. Thus, the front face of transparent materials, such as glass with which the ingredient which has a photocatalyst operation was prepared, becomes a very severe environment about degradation of a sealing material.

[0006]

Using a conversion silicone system and a polyisobutylene system sealing material for the patent reference 2 as a sealant of a building material which has a photocatalyst operation layer on a front face is indicated, and glass is also indicated as a building material. However, in the example, it is only used for non-transparent materials, such as aluminum building materials. If silicone sealant material is contacted in the photocatalyst operation layer of the panel material which has a photocatalyst operation layer in the patent reference 3, it is indicated that a photocatalyst operation acts on direct silicone sealant material, and a silicone sealant deteriorates. A silicone system sealing material excels non-silicone organic macromolecule system sealing materials, such as a conversion silicone system sealing material, in nonpatent literature 1 at weatherability, and it is indicated that a silicone system sealing material fits the sealing material for transparent materials especially. Therefore, if it is this contractor, in the glass with which the layer which has a photocatalyst operation was prepared, the degradation environment of the organic substance is severe and I will think that it is difficult to use a conversion silicone system and a polyisobutylene system sealing material. When using it for glass, it is thought that transmitted light, especially processing which intercepts light, especially ultraviolet rays on glass so that ultraviolet rays may not arrive at the adhesion side of direct glass and a sealing material are performed. Such processing is actually used for sealing of the windshield of an automobile, and this contractor that is going to see the patent reference 2 and is going to use glass is considered to plan such processing.

[Patent reference 1] JP.10-205013.A

[Patent reference 2] JP.2002-187871.A

[Patent reference 3] JP.8-302856.A

[Nonpatent literature 1] Structural sealing material (the 1st edition 2nd **, the 1997 Japan Sealing Material Semiconductor Equipment & Materials International issue)

[Description of the Invention]

[Problem(s) to be Solved by the Invention]

[0007]

The technical problem which this invention tends to solve is a sealing material of a transparent material by which the photocatalyst operation layer which has an antifouling operation is prepared in the front face, and it is in offering the sealing material in which a sealing material cannot deteriorate easily due to light.

[Means for Solving the Problem]

[0008]

Said technical problem is solved by the next invention.

(1) The sealing material characterized by consisting of a polymer of the acrylic which is the sealing material used for a front face combining the transparent material in which the layer which has an antifouling operation is prepared, and has a reactant silicon radical, or a saturated hydrocarbon system.

(2) The sealing material given in (1) the given layer which has an antifouling operation is a layer which has the antifouling operation by the photocatalyst.

(3) A sealing material given in either of (1) - (2) whose transparent materials are glass.

(4) A sealing material given in either of (1) - (3) whose transparent materials are building materials.

(5) A sealing material given in either of (1) - (4) characterized by including the plasticizer which has an acrylic component as a sealing material's constituent.

(6) A sealing material given in either of (1) - (5) characterized by including the compound which has three -COOCH(s) as a sealing material's constituent.

(7) reactivity -- silicon -- a radical -- having -- acrylic -- or -- saturated hydrocarbon -- a system -- a polymer -- COOCH -- three -- a set -- having -- a monomer -- originating -- a

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monomeric unit -- having -- a polymer -- it is -- (one) -- (six) -- either -- a publication -- a sealing material.

(8) The ceiling method using the sealing material which consists of a polymer of the acrylic which is the ceiling method of a transparent material with which the layer which has the antifouling operation by the photocatalyst is prepared in the front face, and has a reactant silicon radical, or a saturated hydrocarbon system.

(9) The ceiling method given in (8) a given transparent material is glass.

(10) A ceiling method given in either of (8) - (9) whose transparent materials are building materials.

(11) A ceiling method given in either of (8) - (10) whose layers which have the antifouling operation by photocatalyst operation on a front face are the ingredient which has a photocatalyst operation, and a layer in which a hydrophilic ingredient is included further.

(12) A ceiling method given in either of (8) - (11) characterized by including the plasticizer which has an acrylic component as a sealing material's constituent.

(13) A ceiling method given in either of (8) - (12) characterized by including the compound which has three -COOCH(s) as a sealing material's constituent.

(14) reactivity -- silicon -- a radical -- having -- acrylic -- or -- saturated hydrocarbon -- a system -- a polymer -- COOCH -- three -- a set -- having -- a monomer -- originating -- a monomeric unit -- having -- a polymer -- it is -- (eight) -- (13) -- either -- a publication -- a ceiling method.

(15) The ceiling method according to claim 8 to 14 characterized by applying the primer of a silicone system to the seal part of a transparent material.

(16) Transparent material which was obtained by one approach of (8) - (15) and by which sealing was carried out.

[0009]

The sealing material of this invention uses the sealing material which consists of a polymer of the acrylic to which silicone oil does not ooze out, or a saturated hydrocarbon system. If such a sealing material is used for transparent materials, such as glass which has a photocatalyst layer and a hydrophilic layer, there is no degradation of the sealing material by light, and it can continue and maintain the fine sight of a transparent material at a long period of time.

[Effect of the Invention]

[0010]

The sealing material of this invention does not cause contamination of transparent materials, such as glass with which antifouling processing was made, and has the effectiveness that a sealing material cannot exfoliate easily in an interface with a transparent material. Moreover, the sealing material of this invention discovers the outstanding weathering adhesive property, also when it uses for the transparent material by which the antifouling operation was made.

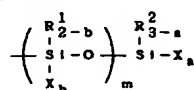
[Best Mode of Carrying Out the Invention]

[0011]

The reactant silicon radical of the polymer used for this invention is a radical which can construct a bridge by forming siloxane association by the reaction in which has the hydroxyl group or hydrolysis nature machine combined with the silicon atom, and a catalyst is carried out by the curing catalyst. As the example of representation,

[0012]

[Formula 1]



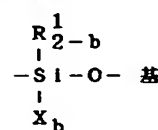
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the inside of a formula, and R1 and R2 -- each -- the alkyl group of carbon numbers 1-20 -- The aryl group of carbon numbers 6-20, the aralkyl radical of carbon numbers 7-20, or R3SiO - (R' is the univalent hydrocarbon group of carbon numbers 1-20) three R' -- being the same -- differing -- *** -- when the Tori ORGANO siloxy radical shown is shown and R1 or two or more R2 exist, they may be the same and may differ. When X shows a hydroxyl group or a hydrolysis nature machine and two or more X exists, they may be the same and may differ. In a, 0, 1, 2, or 3b shows 0, 1, or 2, respectively. Moreover, m pieces

[0013]

[Formula 2]



It is necessary to come out and b in the radical expressed does not need to be the same. m shows the integer of 0-19. However, a+(sum of b) >=1 shall be satisfied. The radical expressed is raised.

[0014]

Especially as a hydrolysis nature machine shown by Above X, not to be limited but what is necessary is just a conventionally well-known hydrolysis nature machine. Specifically, a hydrogen atom, a halogen atom, an alkoxy group, an acyloxy radical, a KETOKISHI mate radical, the amino group, an amide group, an acid-amide radical, an amino oxy-radical, a sulfinyl group, an alkenyloxy radical, etc. are mentioned. Among these, a hydrogen atom, an alkoxy group, an acyloxy radical, a KETOKISHI mate radical, the amino group, an amide group, an amino oxy-radical, a sulfinyl group, and an alkenyloxy radical are desirable, and the viewpoint of hydrolysis nature being quiet and being easy to deal with it to especially an alkoxy group is desirable.

[0015]

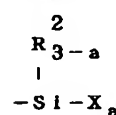
This hydrolysis nature machine and a hydroxyl group can be combined with one silicon atom in the 1-3 range, and a+ (sum of b) has the desirable range of 1-5. When a hydrolysis nature machine and a hydroxyl group join together in [two or more] a reactant silicon radical, they may be the same and may differ.

[0016]

The number of the silicon atoms which form said reactant silicon radical one, and although you may be two or more pieces, in the case of the silicon atom connected by siloxane association etc., there may be about 20 pieces. In addition,

[0017]

[Formula 3]



(-- the inside of a formula, and R2 and X -- the above -- the same -- the reactant silicon

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radical of a expressed with integer) of 1, 2, or 3 is desirable from the point that acquisition is easy.

[0018]

Moreover — the above —izing— one — ** — two — ** — three — it can set — R — one — and — R — two — an example — ***** — for example — a methyl group — an ethyl group — etc. — an alkyl group — cyclohexyl — a radical — etc. — cycloalkyl — a radical — a phenyl group — etc. — an aryl group — benzyl — etc. — an aralkyl — a radical — R — ' — a methyl group — a phenyl group — etc. — it is — R — ' — three — SiO — being shown — having — Tori — ORGANO — siloxy — a radical — etc. etc. — raising — having . Especially in these, a methyl group is desirable.

[0019]

As more concrete instantiation of a reactant silicon radical, a trimethoxysilyl radical, a triethoxy silyl radical, a triisopropoxy silyl radical, a dimethoxymethyl silyl radical, a diethoxymethylsilyl radical, and a JISO propoxy methyl silyl radical are mentioned.

[0020]

It is in the inclination for the reactivity of a reactant silicon radical to become large and for the cure rate of the constituent of this invention to become large, so that the number of the hydrolysis nature machines combined with the silicon atom, especially the same silicon atom increases. However, the elongation after fracture of a hardened material may fall. For example, although a cure rate becomes large, the elongation after fracture of a hardened material tends to become [reactivity] larger than the polymer with which the polymer which a trimethoxysilyl radical has reactivity larger than a dimethoxymethyl silyl radical, and has a trimethoxysilyl radical has a dimethoxymethyl silyl radical small. A hardenability constituent with a large cure rate can be obtained by using the polymer which has a trimethoxysilyl radical or using together the polymer which has a trimethoxysilyl radical, and the polymer which has a dimethoxymethyl silyl radical. Moreover, a hardenability constituent with a large cure rate can be obtained also by introducing both radicals into the same polymer. The amount of the polymers used with large reactivity, such as a polymer which has a trimethoxysilyl radical, the rate of the radical of both in the same polymer, etc. are suitably set that the desired elongation after fracture and the desired cure rate of a hardened material are obtained.

[0021]

As for a reactant silicon radical, it is desirable that 1.1-5 pieces exist preferably in [at least one] 1 molecule of a polymer. If the number of the reactant silicon radicals contained in a molecule becomes less than one piece, hardenability will become inadequate and it will be hard coming to be discovered of good rubber elasticity behavior.

[0022]

The reactant silicon radical may exist in the end of a polymer chain, may exist in the interior, and may exist in both. Since the effective network chain density of the saturated hydrocarbon system polymer component contained in the hardened material finally formed increases when especially a reactant silicon radical exists in a chain end, it is desirable from points, like the rubber-like hardened material of the high elongation in high intensity becomes is easy to be obtained. Moreover, the polymer which has these reactivity silicon radical may be used independently, and may be used together two or more sorts.

[0023]

What is necessary is just to perform installation of a reactant silicon radical by the well-known approach. That is, the following approaches are mentioned, for example.

[0024]

The compound which has the functional group and the reactant silicon radical which show reactivity, such as a hydrosilyl radical, an isocyanate radical, a hydroxyl group, and an amino group, to the organic polymer which has functional groups, such as a partial saturation radical, a hydroxyl group, and an epoxy group, an isocyanate radical, in a molecule to this functional group is made to react. The approach to which the compound which has a reactant silicon radical is made to react in the end of an organic polymer in the above approach is desirable.

[0025]

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There are dimethyl malonate, succinate dimethyl, glutaric-acid dimethyl, adipic-acid dimethyl, dimethyl sebacate, methyl acetate, propionic-acid dimethyl, methyl butyrate, valeric-acid methyl, methyl caprate, methyl laurate, the Mills Chill acid methyl, methyl palmitate, methyl stearate, methyl oleate, methyl linoleate, and coconut fatty-acid methyl. These may be independent or may be used together.

[0032]

— When the compound which has three COOCH(s) is a polymer, although there is especially no limitation, it is desirable to contain the monomer which it has three —COOCH(s) as a copolymerization component. A methyl acrylate is desirable especially if it carries out.

[0033]

— When the monomer which it has three COOCH(s) is a copolymer contained as a constituent, there is especially no limitation about monomers other than —COOCH3. Moreover, although there is especially no limitation about the alkoxy group of an ester group when monomers other than —COOCH3 are acrylic ester (meta), it is desirable that the ester group whose first-class brown coal prime factor is five or more is 80% or less in a mole ratio to three —COOCH(s).

[0034]

— Although it is not especially limited about the alkoxy group of the ester group among the ester groups which monomers other than the monomer which has three —COOCH(s) have when the compound which has three COOCH(s) is the copolymer which contains as a constituent the monomer which has a methyl ester radical, it is desirable that the ester group which are the first-class brown coal prime factors 2-4 is 400% or less in a mole ratio to a methyl ester radical.

[0035]

Although limitation is not carried out, in order to discover the effectiveness which controls the fall of the hardenability by the above-mentioned storage, more ones of the addition of the compound which has three —COOCH(s) in this invention are desirable. However, since the viscosity of a compound and the balance of the hardened material physical properties may collapse when many [too], it is desirable to add the proper amount according to the purpose.

[0036]

— When the compound which has three COOCH(s) is a polymer, although the synthesis method is not limited, well-known various polymerization methods are used. When the monomer which has the three —COOCH(s) is a radical polymerization nature monomer, various control radical polymerization methods including a general free radical polymerization, the free radical polymerization using a chain transfer agent, a continuation-under elevated-temperature high pressure polymerization (it indicates in the Patent Publication Shows No. 502171 [57 to] official report, JP 59-8207A, JP 60-215007A, the Patent Publication Heisei No. 511992 [ten to] official report, etc.), and an atomic migration radical polymerization method that was explained by the term of the synthesis method of the polymer of the component (I) of this patent may be used.

In addition to the above-mentioned acrylic monomer, other monomers may be used together and used. As other monomers, styrene, vinyltoluene, alpha methyl styrene, Styrene system monomers, such as KURORU styrene, a styrene sulfonic acid, and its salt; Perfluoro ethylene, Fluorine content vinyl monomers, such as a perfluoro propylene and vinylidene fluoride; Vinyltrimethoxysilane, Silicon content vinyl system monomers, such as vinyltriethoxysilane; A maleic monoalkyl ester and dialkyl ester of a maleic acid and a maleic acid; A fumaric acid, Monoalkyl ester and dialkyl ester of a fumaric acid; Maleimide, Methyl maleimide, ethylmaleimide, propyl maleimide, butylmaleimide, octyl maleimide, dodecyl maleimide, stearyl maleimide, Maleimide system monomers, such as phenyl maleimide and cyclohexyl maleimide; Acrylonitrile, Nitrile group content vinyl system monomers, such as a methacrylonitrile; Acrylamide, Amide group content vinyl system monomers, such as methacrylamide; Vinyl acetate, Conjugated dienes, such as alkenes; butadienes, such as vinyl ester; ethylene, such as propionic-acid vinyl, vinyl pivalate, benzoic-acid vinyl, and cinnamic acid vinyl, and a propylene, and an isoprene; a vinyl chloride, a vinylidene chloride, an allyl chloride, allyl alcohol, etc. are mentioned. These may be used independently, and even if it carries out copolymerization of the plurality, they are not cared about.

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It is not limited especially as an acrylic monomer which constitutes the principal chain of the acrylic polymer of this invention, but various kinds of things can be used. If it illustrates, an acrylic acid (meta), a methyl acrylate (meta), An ethyl acrylate, acrylic-acid (meta)-n-propyl, acrylic-acid (meta) isopropyl, (Meta) Acrylic-acid-n-butyl, isobutyl acrylate (meta), (Meta) Acrylic-acid-tert-butyl, acrylic-acid (meta)-n-pentyl, (Meta) Acrylic-acid-n-hexyl, acrylic-acid (meta) cyclohexyl, (Meta) Acrylic-acid-n-heptyl, acrylic-acid (meta)-n-octyl, (Meta) 2-ethylhexyl acrylate, acrylic-acid (meta) nonyl, (Meta) Acrylic-acid iso nonyl, acrylic-acid (meta) DESHIRU, acrylic-acid (meta) isodecyl, (Meta) Acrylic-acid iso undecyl, acrylic-acid (meta) dodecyl, (Meta) Acrylic-acid Milla's Chill, acrylic-acid (meta) palmityl, acrylic-acid (meta) stearyl, (Meta) Acrylic-acid ray KOSHIRU, acrylic-acid (meta) phenyl, acrylic-acid (meta) trifluoromethyl, (Meta) Acrylic-acid benzyl, acrylic-acid (meta)-2-methoxy ethyl, (Meta) Acrylic-acid-3-methoxy butyl, acrylic-acid (meta)-2-hydroxyethyl, (Meta) 2-hydroxypropyl acrylate, metaglycidyl acrylate (meta), (Meta) Acrylic-acid 2-aminoethyl, gamma-(methacryloyl oxypropyl) trimethoxysilane, (Meta) The ethyleneoxide addition product of an acrylic acid, acrylic-acid (meta) trifluoromethyl methyl, (Meta) An acrylic-acid 2-trifluoro methylethyl, acrylic-acid (meta) 2-perfluoro ethyl, (Meta) Acrylic-acid 2-perfluoro ethyl-2-perfluoro butyl ethyl, (Meta) Acrylic-acid 2-perfluoro ethyl, acrylic-acid (meta) perfluoro methyl, (Meta) Acrylic-acid JIPA fluoro methyl methyl, acrylic-acid (meta) 2-perfluoro methyl-2-perfluoro ethyl methyl, (Meta) (Meta) Acrylic-acid (meta) system monomers, such as acrylic-acid 2-perfluoro hexyl ethyl, acrylic-acid (meta) 2-perfluoro DESHIRU ethyl, and acrylic-acid (meta) 2-perfluoro hexadecyl ethyl, etc. are raised.

[0026]

Use of the polymer which used three —COOCH(s), such as a methyl acrylate (meta), in these monomers, and the copolymer which used other acrylic monomers, such as acrylic-acid-n-butyl, together especially (meta) improves a sealing material's weathering adhesive property.

[0027]

— the initial adhesive property over the transparence base material in which the layer which has the antifouling operation with photocatalyst glass is prepared is improved by copolymerizing in a polymer the monomer which has COOCH3 — making — *** — things are made and it becomes possible to also raise the weathering adhesive property in a long period of time.

Moreover, it becomes possible to control the hardening delay at the time of storage of a sealing material (delay of leather-covered time amount) by using the monomer which has three —COOCH(s). — As a monomer which has three COOCH(s), although there is especially no limitation, from the height of maleic-acid monomethyl, maleic-acid dimethyl, fumaric-acid monomethyl, dimethyl fumarate, itaconic-acid monomethyl, dimethyl itaconate, the point of polymerization control, and the effectiveness of hardening delay control, a methyl methacrylate and its methyl acrylate are desirable, and especially a methyl acrylate is desirable [limitation] in addition to the above.

[0028]

Moreover, it is desirable although the balance of the above-mentioned effectiveness and viscosity is proper, since viscosity rises with the amount of copolymerization and a sealing material's workability falls as an amount of copolymerization of the monomer which has three —COOCH(s). As an amount of copolymerization, 1-50-mol%, 2-30-mol % is desirable, and especially 5 - 25% is desirable.

[0029]

Moreover, the compound which has three —COOCH(s) can be blended with the sealing material of this invention. This can be controlled when a sealing material generates hardening delay by blending this compound. It is not limited especially as a compound which has three —COOCH(s) used for this invention, but both the thing which is not a polymer, and a polymer can be used.

[0030]

— Although not limited especially as structure of a compound of having three COOCH(s), the effectiveness that that whose carbon atom of the alpha position of three —COOCH(s) is the first class or the second class controls hardening delay is large, and desirable. The following is mentioned as the example.

[0031]

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[0037]

In this invention, block copolymerization may be carried out further and it is desirable in that case copolymerization and that these acrylic monomers are contained 40% or more by the weight ratio. As an acrylic polymer, an acrylic ester system polymer is desirable. In addition, an acrylic polymer may mean the polymer of an acrylic acid and/or, methacrylic acids, or these derivatives, an acrylic acid and/or, or a methacrylic acid may also be called acrylic acid (meta), and a derivative may also carry out the same publication.

[0038]

Although especially the molecular weight distribution of the acrylic polymer of this invention, i.e., the ratio of the weight average molecular weight (Mw) and number average molecular weight (Mn) which were measured with gel permeation chromatography (GPC), (Mw/Mn) are not limited, it is less than 1.8 preferably, is 1.7 or less more preferably, is 1.6 or less still more preferably, is 1.5 or less still more preferably, is 1.4 or less especially preferably, and is 1.3 or less most preferably. In the GPC measurement by this invention, using chloroform as a mobile phase, a polystyrene gel column can perform measurement and number average molecular weight etc. can usually be calculated by polystyrene conversion.

[0039]

Although especially a limit does not have the number average molecular weight of the acrylic polymer of this invention, when it measures with gel permeation chromatography, 3000 or more are desirable, 5000 or more are more desirable, and 10000 or more are still more desirable. If molecular weight is small, the high elongation of a hardened material may be hard to be discovered. Moreover, as for number average molecular weight, 1 million or less are desirable, 100000 or less are more desirable, and 50000 or less are still more desirable.

[0040]

Although limitation may not be carried out but the usual radical polymerization method using the initiator of a peroxide system or an azo system is sufficient as the polymerization method of the acrylic polymer of this invention, its control radical polymerization indicated by JP 2001-329065A is desirable, it is more desirable, and is desirable, [of especially an atomic migration radical polymerization] [of a living radical polymerization]

[0041]

The polymer mixture which added oxy-alkylene polymers, such as an oxypropylene polymer which has a reactant silicon radical, to the acrylic polymer of this invention can be used. In this case, the viscosity of a constituent falls, and elongation of a hardened material can be enlarged and a modulus can be reduced. Such polymer mixture is indicated by each official report of JP 2001-329025A, 2001-329065, 2002-294022, and the international patent application WO 01/No. 90224 by which international public presentation was carried out etc.

[0042]

The saturated hydrocarbon system polymer used in this invention is a concept meaning the polymer which does not contain substantially carbon-carbon unsaturated bonds other than an aromatic series ring, and the polymer used as the frame of a saturated hydrocarbon system polymer which has the reactant silicon radical used for this invention can be obtained by the following approach.

[0043]

(1) The approach to which carbon numbers, such as ethylene, a propylene, 1-butene, and an isobutylene, make the olefinic compound of 1-8 the main monomer, and carry out a polymerization. (2) How to hydrogenate after carrying out homopolymerization of the diene series, such as a butadiene and an isoprene, or carrying out copolymerization of the above-mentioned olefin compound and the diene series.

[0044]

It is desirable that it is the isobutylene system polymer from the point of being able to make [many] the number of end functional groups and hydrogenation poly-butanediene system polymer which are easy to introduce a functional group into an end among these polymers and which are easy to control molecular weight.

[0045]

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the monomeric unit in which all the monomeric units may be formed in per isobutylene, and this isobutylene system polymer has an isobutylene and copolymeric — an isobutylene system polymerization — the inside of the body is desirable and you may contain in 10% or less of range preferably especially 30% or less still more preferably below 50% (% of the weight and the following — the same).

[0046]

As such a monomer component, the olefin of carbon numbers 4-12, vinyl ether, an aromatic series vinyl compound, vinylsilane, and arylsilane are mentioned, for example. As an example of such a copolymer component, for example 1-butene, 2-butene, A 2-methyl-1-butene, a 3-methyl-1-butene, a pentene, 4-methyl-1-pentene, A hexene, a vinyl cyclohexane, the methyl vinyl ether, ethyl vinyl ether, isobutyl vinyl ether, styrene, alpha methyl styrene, dimethyl styrene, Monochlorostyrene, dichloro styrene, beta-pinene, an indene, vinyl trichlorosilane, Vinyl methyl dichlorosilane, vinyl dimethyl chlorosilane, vinyl dimethylmethoxysilane, A vinyl trimethyl silane, divinyl dichlorosilane, divinyl dimethoxysilane, Divinyl dimethylsilane, 1, 3-divinyl - 1, 1, 3, and 3-tetramethyl disiloxane, TORIBI nil methylsilane, a tetra vinyl silane, allyltrichlorosilane, Allyl compound methyl dichlorosilane, allyl compound dimethyl chlorosilane, allyl compound dimethyl methoxysilane, An allyl compound trimethyl silane, diaryl dichlorosilane, diaryl dimethoxysilane, diaryl dimethylsilane, gamma-methacryloyl oxypropyl trimethoxysilane, gamma-methacryloyl oxypropyl methyl dimethoxysilane, etc. are mentioned.

[0047]

If vinylsilane and arylsilane are used as these isobutylenes and a copolymeric monomer, the silicon content of a polymer will increase, the radical which can act as a silane coupling agent increases, and the adhesive property of the constituent obtained improves.

[0048]

Moreover, use of the polymer and copolymer which used the monomer which has three -COOH (a) improves a sealing material's weathering adhesive property.

[0049]

Furthermore, other monomeric units may be made to contain besides the monomeric unit used as a principal component like the case of an isobutylene system polymer in a hydrogenation poly-butadiene system polymer or other saturated hydrocarbon system polymers.

[0050]

moreover, the monomeric unit by which double association after a polymerization like polyene compounds, such as a butadiene and an isoprene, remains in the saturated hydrocarbon system polymer used for this invention in the range in which the purpose of this invention is attained — small quantity — you may make it contain in 1% or less of range 5 more% or less 10% or less especially preferably

[0051]

As for the number average molecular weight of this saturated hydrocarbon system polymer especially an isobutylene system polymer, or a hydrogenation poly-butadiene system polymer, it is desirable that it is 500 to about 100,000 in the polystyrene conversion molecular weight by GPC, and it is especially desirable from points which are 1,000 to about 30,000 — it is easy to deal with liquefied thru/ or the thing which has a fluidity. Furthermore, it is so desirable that Mw/Mn is narrow at the point that the viscosity in the same molecular weight becomes low about molecular weight distribution (Mw/Mn).

[0052]

About the manufacture approach of a saturated hydrocarbon system polymer of having a reactant silicon radical, the case of an isobutylene system polymer and a hydrogenation poly-butadiene system polymer is especially explained as an example. The end organic-functions mold obtained by the polymerization method (cationic polymerization method using the specific compound combining and [which is called iniphor] and a chain transfer agent) the isobutylene system polymer which has a reactant silicon radical at the molecule end among the isobutylene system polymers which have the above-mentioned reactant silicon radical is called iniphor method — it can manufacture using all end organic-functions mold isobutylene system polymers preferably. Such a manufacturing method is indicated by each specification of JP.63-6003.A, 63-

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[0059]

As an example of the organic halogenated compound shown by the above-mentioned general formula, although an allyl chloride, an allyl compound star's picture, vinyl (chloro methyl) benzene, allyl compound (chloro methyl) benzene, allyl compound (bromomethyl) benzene, the allyl compound (chloro methyl) ether, allyl compound (chloro methoxy) benzene, 1-butenyl (chloro methyl) ether, 1-hexenyl (chloro methoxy) benzene, allyloxy (chloro methyl) benzene, etc. are mentioned. It is not limited to these. Since it reacts cheaply easily among these, an allyl chloride is desirable.

[0060]

Installation of the reactant silicon radical to an end olefin hydrogenation poly-butadiene system polymer can be manufactured by carrying out the addition reaction of the hydrosilane compound which the hydrogen atom combined with the radical expressed with a chain end by ** 1 like the case of the isobutylene system polymer which has a reactant silicon radical, and the hydrosilane compound which the hydrogen atom combined with the radical preferably expressed with ** 3 using a platinum system catalyst.

[0061]

As a transparent material used for this invention, synthetic resin, such as glass, a polycarbonate, polymethylmethacrylate, polystyrene, and a polyvinyl chloride, is raised, and glass is desirable. Although transparent materials, such as glass, do not usually have the layer which intercepts or decreases light, especially ultraviolet rays, even if it is such a transparent material according to the approach of this invention, sealing which does not have degradation with time can be performed. Moreover, by sealing materials, such as polyurethane of hygroscopic-moisture hardenability, and conversion silicone (polyether which has a reactant silicon radical), even if it is glass which has the layer which intercepts or decreases light, especially ultraviolet rays, even when deteriorating (it does not have the layer which intercepts or decreases light, especially ultraviolet rays substantially), according to the approach of this invention, sealing without degradation can be performed.

[0062]

As a compound used for the photocatalyst layer which disassembles dirt according to an operation of the photocatalyst of the front face of a transparent material, TiO₂, SrTiO₃, ZnO, CdS, and SnO₂ grade can be illustrated, and especially TiO₂ is desirable. Usually a photocatalyst layer is formed of the particle of such a compound. Especially as a particle size of a particle, 0.01-0.3 micrometers is desirable 0.005-1 micrometer. The thickness of a photocatalyst layer has desirable 0.01-10 micrometers. For forming the photocatalyst layer to a transparent-material top, it can be based on the approach of immersion of a solution and dispersion liquid, a spatter, thermal spraying, a spray, etc.

[0063]

The hydrophilic matter which washes out dirt with water, such as storm sewage, can be made to live together in a photocatalyst layer. As a compound used for the hydrophilic matter, a silicon system oxide, such as an inorganic system oxide, especially a silica, is raised. Although a photocatalyst layer can also turn into a hydrophilic layer, a layer including the both sides of hydrophilic layers other than a photocatalyst layer and a photocatalyst layer, for example, a layer including the both sides of TiO₂ and a silica, **, especially its antifouling operation are remarkable, and are desirable. Moreover, the metal, the metallic compounds, or the organic compound which has antibacterial can also be made to live together in a photocatalyst layer, and generating of mold etc. can be prevented. About the matter and photocatalyst layer which have a photocatalyst operation, various modes besides the above-mentioned matter are indicated by JP.2002-167871.A, and those modes can be used also in this invention.

[0064]

The sealing material which uses it for this invention can use it also for the transparent material in which the layer which has the antifouling operation which consists of hydrophilic matter which does not contain a photocatalyst is prepared.

[0065]

although there is especially no constraint and a general method of construction is used as a

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6041, 63-254149, 64-22904, and 64-38407 etc. It is desirable to manufacture the isobutylene system polymer which has a reactant silicon radical at the end by carrying out the addition reaction of the hydrosilane compound which the hydrogen atom combined with the radical expressed with an end by ** 1 by the isobutylene system polymer which has a partial saturation radical, and the hydrosilane compound which the hydrogen atom combined with the radical preferably expressed with ** 3 using a platinum system catalyst.

[0053]

Moreover, the isobutylene system polymer which has a reactant silicon radical inside a molecule is manufactured by adding and carrying out copolymerization of the vinylsilane and arylsilane which have a reactant silicon radical into the monomer which makes an isobutylene a subject.

[0054]

Furthermore, after carrying out copolymerization of the vinylsilane and arylsilane etc. which have a reactant silicon radical in addition to the isobutylene monomer which is a principal component in the polymerization at the time of manufacturing the isobutylene system polymer which has a reactant silicon radical at the molecule end, the isobutylene system polymer which has a reactant silicon radical inside an end and a chain can be manufactured by introducing a reactant silicon radical into an end.

[0055]

As examples, such as vinylsilane which has this reactant silicon radical, and arylsilane For example, vinyl trichlorosilane, vinyl methyl dichlorosilane, vinyl dimethyl chlorosilane, Vinyl dimethylmethoxysilane, divinyl dichlorosilane, divinyl dimethoxysilane, Allyltrichlorosilane, allyl compound methyl dichlorosilane, allyl compound dimethyl chlorosilane, Allyl compound dimethyl methoxysilane, diaryl dichlorosilane, diaryl dimethoxysilane, gamma-methacryloyl oxypropyl trimethoxysilane, gamma-methacryloyl oxypropyl methyl dimethoxysilane, etc. are mentioned.

[0056]

About the manufacturing method of a hydrogenation poly-butadiene system polymer For example, it is the hydroxyl group of an end hydroxy hydrogenation poly-butadiene system polymer first - ONa, - General formula CH₂=CH-R₃-Y after making it oxy-metal radicals, such as O.K: (Y is halogen atoms, such as a chlorine atom and iodine atom, among a formula R₃) - R₄-, -R₄-OC(=O)-, -R₄-C(=O)- (R₄ is the divalent hydrocarbon group of carbon numbers 1-20) as a desirable example, an alkylene group, a cyclo alkylene group, an arylene radical, and an aralkylene group mention — having — the divalent organic radical shown — it is -CH₂- and -R' -Ph-CH₂- (R' is the hydrocarbon group of carbon numbers 1-10, and Ph is p-phenylene group.) from — especially the divalent radical chosen is desirable. By making the organic halogenated compound shown react, the hydrogenation poly-butadiene system polymer (henceforth an end olefin hydrogenation poly-butadiene system polymer) which has an end olefin radical can be manufactured.

[0057]

Alkali metal like Na and K as an approach of making the end hydroxyl group of an end hydroxy hydrogenation poly-butadiene system polymer an oxy-metal radical; it is metal hydride; NaOCH₃ like NaH. A metal alkoxide [like] : a caustic alkali like NaOH and KOH etc. and the approach of making it react can be mentioned.

[0058]

Although the end olefin hydrogenation poly-butadiene system polymer which has the almost same molecular weight as the end hydroxy hydrogenation poly-butadiene system polymer used as a start raw material in the above-mentioned approach is obtained in order to obtain the polymer of the amount of macromolecules more, before making the organic halogenated compound of the above-mentioned general formula react After making it react with the multiple-valued organic halogenated compound which contains two or more halogen atoms in 1 molecules, such as a methylene chloride, bis(chloro methyl) benzene, and the bis(chloro methyl) ether, and increasing molecular weight. If it is made to react with the organic halogenated compound shown by the above-mentioned general formula, the hydrogenation poly-butadiene system polymer which has an olefin radical at the end can be obtained more in the amount of giant molecules.

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method of construction which attaches the transparent material of this invention — desirable — A glass curtain wall method of construction, a sash frame fitting method of construction, a metal curtain wall method of construction, a glass screen method of construction, and SUTORAKUCHARU Sealant Grading A system method of structure (speed signal generator method of structure), a strengthening glass screen method of construction, and dot The point A grading method of construction (DPG method of construction) and metal The point A grading method of construction (MPG method of construction) etc. can be mentioned.

[0068]

As an example of the above-mentioned glass curtain wall method of construction, a unit type curtain wall method of construction, a knockdown type curtain wall method of construction, a concomitant use type curtain wall method of construction, etc. can be mentioned.

[0067]

Although it can use without constraint especially if it is glass when using glass by this invention, float plate glass, polished glass, figured glass, wire glass, line ON sheet glass, heat ray absorption plate glass, heat reflective glass, tempered glass, double tempered glass, a glass laminate, multiple glass, vacuum multiple glass, a heat quantity cutoff adiabatic dual glass, fire prevention glass, electromagnetic wave cutoff glass, and other various functional glass can be mentioned preferably.

[0068]

As a ceiling method using the sealing material of this invention, although there is especially no constraint, it is preferably performed by spreading of cleaning of a covering side, back-up material insertion, a masking tape flare, and a primer, a sealing material's restoration, a sealing material's finishing, masking tape removal, cleaning, and care of health.

[0069]

Cleaning of a covering side is performed in order to remove what checks adhesion of rust, oil, dust, mortar waste, a coating, etc. It is necessary to carry out by the approach that it is suitable for the adherent concerned in cleaning.

In addition, on the occasion of process [degree] shift, it cares about drying a covering side.

[0070]

Back-up material is inserted for the purpose of reservation of two-sided adhesion, or adjustment of the restoration depth. Usually, as back-up material, polyethylene closed cell foam, polyethylene open-cell foam + polyethylene closed cell foam, synthetic rubber, etc. are used. Generally as synthetic rubber, materials, such as a chloroprene, EPDM, and vinyl chloride resin, are used.

[0071]

A masking tape prevents contamination of the component after degree process, and it is used for it in order to let the line of both the sealing material's edges pass finely. What can be used as a common masking tape as the quality of the material is used.

[0072]

Since a primer pastes up a covering side and sealing, it is applied to a covering side by it if needed. There is no constraint especially as a primer to be used, and what is generally used to a glass side can be used. Preferably, a silicone system, a silane system, etc. can be mentioned.

[0073]

the gun which equipped the nozzle which suited to joint width — from a joint bottom — carrying out — a clearance — it strikes and leaves, and it carries out, pressurizing so that there may be no mixing ** of air.

[0074]

As a sealing material's finishing approach, it fills up in a joint and spatula finishing is carried out. Although the usual spatula finishing is sufficient in case spatula finishing is carried out, it is desirable for the spatula constituted by polyethylene foam BAKKA, rubber, etc. to be immersed in organic solvents, such as kerosene, normal hexane, and toluene, and to rub a sealing material's front face against them in the same direction in the spatula especially.

[0075]

Removal of a masking tape is immediately performed after spatula finishing.

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[0078]

Cleaning is performed after masking tape removal and on the outskirts of a joint.

[0077]

Then, since a non-hardened sealing material becomes causes, such as surrounding contamination, he recuperates himself using suitable ingredients, such as a film, a sheet, and plywood.

[0078]

The way used although it is not necessary to carry out even if it uses a curing catalyst for the sealing material of this invention enlarges a cure rate and is desirable. When using a curing catalyst, a well-known thing can be used widely conventionally. As the example, tetrabutyl titanate, tetra-propyl titanate, Titanium compounds, such as titanium tetra-acetylacetonate; Dibutyltin dilaurate, Dibutyltin maleate, dibutyltin phthalate, dibutyltin JIOKUTETO, Dibutyltin diethyl hexanoate, dibutyltin dimethyl maleate, Dibutyltin diethyl maleate, dibutyltin dibutyl maleate, Dibutyltin dioctyl maleate, dibutyl SUZUJI tridecyl maleate, Dibutyltin dibenzyl maleate, Dibutyltin diacetate, dioctyl tin diethyl maleate, Dioctyl tin dioctyl maleate, a dibutyltin JIMETOKI side, dibutyltin dimethyl phenoxide and a job — thenyl tin oxide — Dibutyltin diacetyl acetone, dibutyltin diethyl aceto acetone, Tetravalent tin compounds, such as a reactant of dibutyltin oxide and phthalic ester; Octylic acid tin, Divalent tin compounds, such as naphthenic-acid tin, stearin acid tin, and BASA tic acid tin; Aluminum tris acetylacetonate, Zirconium compound lead octylate, such as organoaluminum compound; zirconium tetra-acetylacetonate, such as aluminum tris ethyl acetoacetate and JISOPUPROPOKISHI aluminum ethyl acetoacetate; A butylamine, an octyl amine, Dibutyl amine, monoethanolamine, diethanolamine, triethanolamine, Diethylenetriamine, triethylenetetramine, an oleyl amine, Cyclohexylamine, benzylamine, diethylaniline, propylamine, Xylylene diamine, triethylenediamine, guanidine, diphenylguanidine, 2, 4, 6-tris (dimethyl aminomethyl) phenol, a morpholine, Amine system compounds, such as N-methyl morpholine, 2-ethyl-4-methylimidazole, 1, and 8-diazabicyclo (3, 4, 0) undecene -7 (DBU), or salt [with the carboxylic acid of these amines system compound etc.]; — low-molecular-weight polyamide resin; obtained from superfluous polyamine and polybasic acid — the resultant; gamma-aminopropyl trimethoxysilane of a superfluous polyamine and a superfluous epoxy compound — Well-known silanol condensation catalysts, such as silanol condensation catalysts, such as silane coupling agent; which has amino groups, such as N-(beta-aminomethyl) aminopropyl methyl dimethoxysilane, an acid catalyst of further others, and a basic catalyst, etc. are mentioned. These catalysts may be used independently and may be used together two or more kinds.

[0079]

The amount of these curing catalysts used has desirable 0.1 – 20 weight section extent to the polymer 100 weight section which has a reactant silicon radical, and its 1 – 10 weight section extent is still more desirable. If there is too little amount of the curing catalyst used, since a cure rate will become slow and a hardening reaction will stop being able to go on fully easily, it is not desirable. On the other hand, if there is too much amount of the curing catalyst used, since a good hardened material will become local generation of heat and local foaming arise, and is hard to be obtained at the time of hardening, it is not desirable.

[0080]

It is a general formula in order to raise the activity of a condensation catalyst more in the sealing material of this invention. $\text{RaSi}(\text{OR})_4\text{-a}$ (R is the permutation or the unsubstituted hydrocarbon group of carbon numbers 1–20 independently among a formula, respectively.) Furthermore, a is 0, 1, 2, or 3. The silicon compound shown may be added. As said silicon compound, although not carried out, since the effectiveness of limitation that that whose R in general formulas, such as phenyltrimethoxysilane, phenylmethyldimethoxysilane, phenyldimethyldimethoxysilane, diphenyldimethoxysilane, diphenyl diethoxysilane, and triphenylmethoxysilane, is the aryl group of carbon numbers 6–20 accelerates the hardening reaction of a constituent is large, it is desirable. Especially diphenyldimethoxysilane and diphenyl diethoxysilane are low cost, and especially since acquisition is easy, they are desirable. The loadings of this silicon compound have desirable 0.01 – 20 weight section extent to the polymer 100 weight section which has a reactant silicon

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radical, and its 0.1 – 10 weight section is still more desirable. If the loadings of a silicon compound are less than this range, the effectiveness of accelerating a hardening reaction may become small. On the other hand, when the loadings of a silicon compound exceed this range, the degree of hardness and tensile strength of a hardened material may fall.

[0081]

The sealing material of this invention can add the reactant of a silane coupling agent and a silane coupling agent, or compounds other than a silane coupling agent as an adhesive grant agent. As an example of a silane coupling agent, gamma-isocyanate propyltrimethoxysilane, gamma-isocyanate propyl triethoxysilane, gamma-isocyanate propylmethyl diethoxysilane, Isocyanate radical content silanes, such as gamma-isocyanate propylmethyl dimethoxysilane, gamma-aminopropyl trimethoxysilane, gamma-aminopropyl triethoxysilane, gamma-aminopropyl methyl diethoxysilane, gamma-aminopropyl methyl dimethoxysilane, gamma-(2-aminomethyl) aminopropyl methyl dimethoxysilane, gamma-(2-aminomethyl) aminopropyl triethoxysilane, gamma-(2-aminomethyl) aminopropyl methyl dimethoxysilane, gamma-ureido propyltrimethoxysilane, N-phenyl-gamma-aminopropyl triethoxysilane, Amino-group content silanes; gamma-mercaptopropyltrimethoxysilane, such as N-benzyl-gamma-aminopropyl trimethoxysilane and N-vinylbenzyl-gamma-aminopropyl triethoxysilane, gamma-mercaptopropyl triethoxysilane, gamma-mercaptopropylmethyl dimethoxysilane, Sulfhydryl group content silanes, such as gamma-mercaptopropylmethyl diethoxysilane; Gamma-glycidoxypolytrimethoxysilane, gamma-glycidoxypolytriethoxysilane, gamma-glycidoxypoly methyl dimethoxysilane, beta-(3, 4-epoxycyclohexyl) ethyltrimethoxysilane, Epoxy group content silanes, such as beta-(3, 4-epoxycyclohexyl) ethyltriethoxysilane; beta-carboxy ethyltriethoxysilane, A beta-carboxy ethyl phenyl bis(2-methoxyethoxy) silane, Carboxy silanes, such as N-beta-(carboxymethyl) aminoethyl-gamma-aminopropyl trimethoxysilane; Vinyltrimethoxysilane, Vinyltriethoxysilane, gamma-methacryloyl acrypropyl methyl dimethoxysilane, vinyl mold partial saturation radical content silanes [such as gamma-acryloyloxy propylmethyl triethoxysilane,]; — halogen content silanes [such as gamma-chloropropyltrimethoxysilane,]; — isocyanurate silanes, such as tris (trimethoxysilyl) isocyanurate It can mention. Moreover, the amino denaturation silyl polymer which is the derivative which denaturalized these, a silanizing amino polymer, a partial saturation amino silane complex, a phenylamino long-chain alkyl silane, amino silanizing silicone, silanizing polyester, etc. can be used as a silane coupling agent. A silane coupling agent is usually used in the range of 0.1 – 20 weight section to the polymer 100 weight section which has a reactant silicon radical. It is desirable to use it in the range of 0.5 – 10 weight section especially.

[0082]

The effectiveness of the silane coupling agent added by the sealing material of this invention shows a remarkable adhesive improvement effect under non primer conditions or priming conditions to various adherends. When it is used under non primer conditions, especially the effectiveness of improving the adhesive property over various adherends is remarkable. Especially as examples other than a silane coupling agent, although not limited, an epoxy resin, phenol resin, sulfur, alkyl titanate, aromatic series poly isocyanate, etc. are mentioned, for example. The above-mentioned adhesive grant agent may be used only by one kind, and may carry out two or more kind mixing use. These adhesive property grant agent can improve the adhesive property over adherend by adding.

[0083]

The sealing material of this invention can blend various bulking agents. As a bulking agent, a fumes silica, a sedimentation nature silica, a crystalline silica, fused silica, A dolomite, a silicic acid anhydride, a water silicic acid, and the reinforcement nature bulking agent like carbon black; Whiting. A colloid calcium carbonate, a magnesium carbonate, the diatom earth, baking clay, Clay, talc, titanium oxide, a bentonite, organic bentonite, ferric oxide, Aluminum impalpable powder, the Flint powder, a zinc oxide, an active white, mill balun, The bulking agent like resin powder, such as glass micro balun, organic micro balun of phenol resin or vinylidene chloride resin, PVC powder, and PMMA powder; the fibrous bulking agent like asbestos, a glass fiber, and a filament etc. is mentioned. the polymer 100 weight section in which the amount used has a reactant

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silicon radical when using a bulking agent — receiving — the 1 – 300 weight section — it is the 10 – 200 weight section preferably.

[0084]

The bulking agent mainly chosen from fumed silica, a sedimentation nature silica, a crystalline silica, fused silica, a dolomite, a silicic acid anhydride, a water silicic acid and carbon black, a surface treatment detailed calcium carbonate, baking clay, clay, an active white, etc. is desirable, and a desirable result will be obtained to obtain a hardened material with high reinforcement by use of these bulking agents if it is used in the range of the 1 – 200 weight section to the polymer 100 weight section which has a reactant silicon radical. Moreover, when elongation after fracture wants to obtain the hardened material which is size with low strength, a desirable result will be obtained if the bulking agent mainly chosen from titanium oxide, a calcium carbonate, a magnesium carbonate, talc, ferric oxide, a zinc oxide, mill balun, etc. is used in the range of the 5 – 200 weight section to the polymer 100 weight section which has a reactant silicon radical. In addition, generally, the breaking strength of a hardened material, elongation after fracture, and an adhesive improvement effect become large, so that the value of a calcium carbonate of specific surface area is large. Of course, these bulking agents may be used only by one kind, and may carry out two or more kind mixing use. Particle size, such as whitening with which surface treatment is not considered as a fatty-acid surface treatment colloid calcium carbonate, can use together and use a calcium carbonate 1micro or more.

[0085]

In order to make improvement in workability of a sealing material, such as etc., going berserk, and a hardened material front face into the letter of grinding, organic balun and inorganic balun may be added. Surface treatment of these bulking agents can also be carried out, they may be used only by one kind and two or more kind mixing use can also be carried out to improvement in workability, such as etc., going berserk, the particle size of balun has 0.1 desirablemm or less. In order to make a hardened material front face into the letter of grinding, 5–300 micrometers is desirable.

[0086]

Moreover, 0.1mm or more, if about 0.1–5.0mm the shape of a scale and the granular matter is blended preferably, a hardened material will serve as a front face with the feeling of a rough deposit of a sander tone or a sandstone tone, and if a diameter uses the scale-like matter, it will serve as a concave convex front face which originates in the shape of a scale.

[0087]

The shape of a scale, the desirable diameter of the granular matter, loadings, the ingredient, etc. are as follows as indicated by JP.9–53063.A.

[0088]

A diameter is about 0.1–5.0mm preferably 0.1mm or more, and the thing of suitable magnitude is used according to the quality of the material of an outer wall, a pattern, etc. A thing (0.2mm – about 5.0mm and 0.5mm – about 5.0mm) is also usable. In the case of the scale-like matter, let thickness be the thickness (about 0.01–1.00mm) which is about 1 of a diameter / ten to 1/5. It is beforehand mixed in a sealing principal member, and the shape of a scale and the granular matter are carried as a sealing material in a construction site, or is mixed in a sealing principal member on the occasion of use in a construction site.

[0089]

As for the shape of a scale, and the granular matter, 1 – 200 weight section extent is blended to the sealing material constituent 100 weight section. Loadings are selected by each shape of a scale, the magnitude of the granular matter, the quality of the material of an outer wall, the pattern, etc.

[0090]

As the shape of a scale, and granular matter, inorganic substances, such as natural products, such as silica sand and a mica, synthetic rubber, synthetic resin, and an alumina, are used. In order to raise the design nature at the time of filling up the joint section, according to the quality of the material of an outer wall, a pattern, etc., it is colored a suitable color.

[0091]

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The desirable approach of finishing etc. is indicated by JP.9–53063.A.

[0092]

Moreover, if balun (mean particle diameter is a thing 0.1mm or more preferably) is used for the same purpose, it becomes a front face with the feeling of a rough deposit of a sander tone or a sandstone tone, and lightweight-ization can be attained. The desirable diameter of balun, loadings, the ingredient, etc. are as follows as indicated by JP.10–251618.A.

[0093]

The interior of balun is a thing in the air in a spherule bulking agent. Although the ingredient of organic systems, such as an ingredient of inorganic systems, such as glass, mill, and a silica, and phenol resin, a urea-resin, polystyrene, and saran, is raised, the ingredient of an inorganic system and the ingredient of an organic system are compounded, and it is not limited to seeing, a laminating can be carried out [these], and two or more layers can also be made to form as an ingredient of this balun. Or it is an inorganic system, it is an organic system or the balun which compounded these can be used. Moreover, whether it uses the same balun or the balun of an ingredient of a different kind is used for the balun to be used by two or more kinds, mixing, it does not cause inconvenience. Furthermore, what could also use what processed thru/ or coated the front face, and processed the front face by various kinds of finishing agents can also be used for balun. For example, the balun of an organic system is coated with a calcium carbonate, talc, titanium oxide, etc., or carrying out surface treatment of the balun of an inorganic system by the silane coupling agent etc. is raised.

[0094]

In order to obtain a front face with the feeling of a rough deposit of a sander tone or a sandstone tone, as for balun, it is desirable that particle size is 0.1mm or more. A thing (0.2mm – about 5.0mm and 0.5mm – about 5.0mm) is also usable. At a less than 0.1mm thing, even if it blends so much, a feeling of a rough deposit may not be demonstrated only by raising the viscosity of a constituent. The loadings of balun can be easily defined with extent of the feeling of a rough deposit of the sander tone made into the purpose, or a sandstone tone. Usually, it is desirable for particle size to blend a thing 0.1mm or more at a rate which serves as the range of 5 – 25vol% by the volume concentration in a constituent. When there is no feeling of a rough deposit that the volume concentration of balun is less than [5vol%] and 25vol% is exceeded, a sealing material's viscosity becomes high, it is bad, and workability becomes high and the modulus of a hardened material also has it in the inclination for a sealing material's fundamentality ability to be spoiled. The volume concentration with especially desirable balance with a sealing material's fundamentality ability is 8 – 22vol%.

[0095]

In case balun is used, the 1st class and/or secondary amine with an amine compound [for adding the front face of a slip inhibitor which is indicated by JP.2000–154388.A, and a hardened material which is indicated by JP.2001–164237.A to concave convex voice, and changing into a haterless condition], especially a melting point of 35 degrees C or more can be added.

[0096]

The example of balun is indicated by each official report, such as JP.2–129262.A, JP.4–8788.A, JP.4–173887.A, JP.5–1225.A, JP.7–113073.A, JP.9–53063.A, JP.10–251618.A, JP.2000–154388.A, JP.2001–164237.A, and WO 97/No. 05201.

[0097]

If the constituent of this invention contains a sealing material hardened material particle, a hardened material can form irregularity in a front face, and can raise design nature. The desirable diameter of a sealing material hardened material particle, loadings, the ingredient, etc. are as follows as indicated by JP.2001–115142.A. 0.1mm – 1mm and about further 0.2–0.5mm of a diameter are desirable. 5 – 100 % of the weight and further 20 – 50 % of the weight of loadings are desirable in a hardenability constituent. Although an ingredient will not be limited if it can mention urethane resin, silicone, conversion silicone, polysulfide rubber, etc. and is used for a sealing material, its sealing material of a conversion silicone system is desirable.

[0098]

The sealing material of this invention can add a plasticizer component. Although not limited

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especially as a plasticizer, for the purpose, such as adjustment of physical properties, and accommodation of description. For example, dibutyl phthalate, diheptylphthalate, di(2-ethylhexyl) phthalate, Phthalic ester, such as butyl benzyl phthalate; Dioctyl adipate. Non-aromatic dibasic acid esters, such as dioctyl sebacate, dibutyl sebacate, and succinic-acid isodecyl Butyl oleate. Aliphatic ester series, such as methyl acetyl ricinolate; Tricresyl phosphate, phosphoric ester [such as tributyl phosphate,]; — trimellitic acid ester; — chlorinated paraffin; — alkyl diphenyl — hydrocarbon system oil [such as partial hydrogenation terphenyl,]; — process oil; — epoxy plasticizers, such as epoxidized soybean oil and epoxy stearin acid benzyl, are raised.

[0099] Moreover, a polymer plasticizer can be used. If a polymer plasticizer is used, as compared with the case where the low-molecular plasticizer which is a plasticizer which does not contain a polymer component in a molecule is used, early physical properties are maintained over a long period of time, and it can improve drying [at the time of applying an alkyl coating to this hardened material] (it is also called paintwork). The vinyl system polymer obtained as an example of a polymeric plasticizer by carrying out the polymerization of the vinyl system monomer by various approaches; Diethylene glycol dibenzoate. The ester of polyalkylene glycols, such as TORIECHIRENGURIKORUJIBENZOETO and pentaerythritol ester. A sebacic acid, Dibasic acid and ethylene glycol, such as an adipic acid, an azelaic acid, and a phthalic acid, A diethylene glycol, triethylene glycol, propylene glycol. The polyester plasticizer obtained from dihydric alcohol, such as dipropylene glycol; 500 or more molecular weight. Further 1000 or more polyethylene glycols, a polypropylene glycol. The hydroxyl group of polyether polyols, such as a polytetramethylene glycol, or these polyethers polyol An ester group, polyethers [such as a derivative changed into the ether group etc.,]; — polystyrene [such as polystyrene and Poly alpha methyl styrene,]; although polybutadiene, polybutene, a polyisobutylene, butadiene-acrylonitrile, polychloroprene, etc. are mentioned It is not limited to these.

[0100] these plasticizers — independence — or two or more sorts can use it, mixing. Moreover, a plasticizer can also be blended at the time of polymer manufacture.

[0101] It is desirable to use together the plasticizer which has an acrylic component especially to the sealing material of this invention. The plasticizer which has an acrylic component is the polymer of acrylic monomers, such as acrylic ester and acrylamide. A polymer including the copolymer of acrylic ester and the copolymer of acrylic ester and other monomers are desirable. The acrylic ester used for manufacture of the acrylic polymer of this invention as an example of acrylic ester can be illustrated. Acrylic-acid alkyl ester is desirable and the acrylic-acid alkyl ester which has the alkyl group of the carbon numbers 1-8, such as butyl acrylate and an ethyl acrylate, especially is desirable. While being able to adjust mechanical characteristics, such as tensile strength of the hardened material which hardens the viscosity of a hardenability constituent, slump nature, and a constituent, and is obtained by addition of this plasticizer, and elongation after fracture, as compared with the case where the plasticizer which does not contain an acrylic component in a molecule is used, good adhesion weatherability is maintainable over a long period of time.

[0102] 500-15,000 are 800-10,000 desirable still more preferably, and the number average molecular weight of the plasticizer which has the above-mentioned acrylic component is 1,000-8,000 more preferably. If molecular weight is too low, a plasticizer will flow out with time by heat or the rainfall, early physical properties cannot be maintained over a long period of time, but it is in the inclination for weatherability not to be improvable, either. Moreover, it is in the inclination for viscosity to become high if molecular weight is too high, and for workability to worsen. Since the plasticizer which has an acrylic component acts as a plasticizer, usually viscosity is smaller than the polymer which has a reactant silicon radical. As for especially the plasticizer that has an acrylic component, it is desirable for viscosity to be smaller than the polymer which has a reactant silicon radical. A small thing is [1,000 or more / further 2,000 or more / 3,000 or more] especially more desirable [the plasticizer which has an acrylic component about number average

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[0106] Moreover, the compound which generates the silicon compound which is the derivative of an oxy-alkylene polymer which is indicated by JP.7-258534.A, and generates R3SiOH(s), such as a trimethyl silanol, by hydrolysis can also be raised. The polymer which has the silicon content radical which can serve as a mono-silanol content compound by the hydrolysis nature silicon content radical and hydrolysis in which the bridge formation furthermore indicated by JP.6-279693.A is possible can also be used.

[0107] the polymer 100 weight section in which a physical-properties regulator has a reactant silicon radical — receiving — 0.1 - 20 weight section — it is preferably used in the range of 0.5 - 10 weight section.

[0108] In the sealing material of this invention, a lappet is prevented if needed, and in order to improve workability, a thixotropic grant agent (lappet inhibitor) may be added. Moreover, although not limited especially as a lappet inhibitor, metallic soap, such as polyamide wax; hydrogenation castor oil derivative; calcium stearate, aluminum stearate, and barium stearate, is mentioned, for example. These thixotropic grant agent (lappet inhibitor) may be used independently, and may be used together two or more sorts. A thixotropic grant agent is used in the range of 0.1 - 20 weight section to the polymer 100 weight section which has a reactant silicon radical.

[0109] The compound which contains an epoxy group in 1 molecule in the sealing material of this invention can be used. If the compound which has an epoxy group is used, the stability of a hardened material can be raised. The compounds shown in epoxidation partial saturation fats and oils, epoxidation unsaturated fatty acid ester, alicyclic group epoxy compounds, and an epichlorohydrin derivative as a compound which has an epoxy group, those mixture, etc. can be illustrated. Specifically, epoxidized soybean oil, epoxidation linseed oil, G (2-ethylhexyl) 4, 5-epoxy cyclohexane -1, 2-JIKABOKISHI rate (E-PS), epoxy octyl stearate, epoxy butyl stearate, etc. are raised. Especially in these, E-PS is desirable. It is desirable to use the compound which has one epoxy group in a molecule for the purpose which raises the stability of a hardened material. An epoxy compound is good to use it in the range of 0.5 - 50 weight section to the polymer 100 weight section which has a reactant silicon radical.

[0110] The photoresist matter can be used for the sealing material of this invention. If the photoresist matter is used, the coat of the photoresist matter is formed in a hardened material front face, and stickiness of a hardened material and the weatherability of a hardened material can be improved. According to an operation of light, considerably, the molecular structure causes a chemical change for a short time, and, as for the photoresist matter, produces physical-properties-change of hardening etc. for it. Many things, such as a constituent which contains an organic monomer, oligomer, resin, or them in this kind of compound, are known, and the thing of commercial arbitration can be adopted. As a typical thing, a partial saturation acrylic compound, Pori cinnamic-acid vinyl, or azide-ized resin can be used. As a partial saturation acrylic compound, in acrylic or an methacrylic system partial saturation radical, it is mixture, such as 1 thru/ or a monomer which it has partly, oligomer, or it, and monomers, such as propylene (or butylene, ethylene) GURIKORUJI (meta) acrylate and neopentyl GURIKORUJI (meta) dimethacrylate, or with a molecular weight of 10,000 or less oligo ester is illustrated. Specifically For example, special acrylate ARONIKKUSU M-210 (2 Functional), ARONIKKUSU M-215, ARONIKKUSU M-220, ARONIKKUSU M-233, ARONIKKUSU M-240, ARONIKKUSU M-245; (three organic functions) ARONIKKUSU M-305, ARONIKKUSU M-309, ARONIKKUSU M-310, ARONIKKUSU M-315, ARONIKKUSU M-320, and ARONIKKUSU M-325 — and (polyfunctional) ARONIKKUSU M-400 etc., although it can illustrate The compound containing especially an acrylic functional group is desirable, and the compound which averages in 1 molecule and contains these three or more functional groups is desirable. (Each ARONIKKUSU is the product of Toagosei Chemical Industry Co., Ltd. above.) As Pori cinnamic-acid vinyl, it is the photopolymer which makes a cinnamoyl radical a sensitization radical, and although polyvinyl

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molecular weight] then the polymer which has a reactant silicon radical as number average molecular weight. The number average molecular weight of the plasticizer which has an acrylic component is measured as polystyrene conversion molecular weight by GPC. Moreover, a molecular weight distribution (Mw/Mn) is measured using GPC (polystyrene conversion).

[0103] Although the molecular weight distribution manufactured according to the living radical polymerization proposed by JP.2000-178456.A etc. as an example of a plasticizer of having an acrylic component can illustrate 1.8 or less acrylic (meta) polymer, it is not limited to especially these. Moreover, the polymer by the SGO process currently manufactured by the "industrial ingredient" August, 1998 issue P.110 by Toagosei, Inc. of a publication and Johnson Polymer can also be used. A SGO polymer can obtain an acrylic ester system monomer according to a continuation bulk polymerization with an elevated temperature and high pressure. Usually, it is liquefied in ordinary temperature and what does not have a functional group is used. These may be used independently and may use two or more sorts together. Moreover, you may use together with a low-molecular plasticizer further in the range which does not have a bad influence on physical properties depending on the need. The plasticizer which has these acrylic components may be an acrylic polymer which does not have a reactant silicon radical, and may be an acrylic polymer which has a reactant silicon radical. The hydroxyl group of the polymer by the SGO process containing a hydroxyl group is used, and a reactant silicon radical can be introduced. The acrylic polymer which has a reactant silicon radical acts as a reaction plasticizer, and has effectiveness, like the bleeding of a plasticizer is lost in a hardened material. If a reactant silicon radical averages and it exists exceeding one piece in 1 molecule, the effect of the tractive characteristics on a hardened material will become large. The plasticizer which has acrylic components, such as an acrylic polymer which averages in a molecule and has one or less reactant silicon radical, is desirable as a reaction plasticizer.

[0104] The physical-properties regulator which adjusts the tractive characteristics of the hardened material generated if needed to the sealing material of this invention may be added. Although not limited especially as a physical-properties regulator, for example Methyl trimethoxysilane, Alkyl alkoxysilane, such as dimethyldimethoxysilane, trimethylmethoxysilane, and n-propyltrimethoxysilane; Dimethyl JIISO propenoxysilane, Alkyl iso propenoxysilane, such as methyl TORIISO propenoxysilane and gamma-glycidoxy propylmethyl JIISO propenoxysilane, gamma-glycidoxy propyl methyl dimethoxysilane, gamma-glycidoxypropyltrimethoxysilane, Vinyltrimethoxysilane, vinyl dimethyldimethoxysilane, gamma-aminopropyl trimethoxysilane, The alkoxysilane; silicone varnishes which have functional groups, such as N-(beta-aminoethyl) aminopropyl methyl dimethoxysilane, gamma-mercaptopropyltrimethoxysilane, and gamma-mercaptopropylmethyl dimethoxysilane; polysiloxanes are mentioned. By using said physical-properties regulator, the degree of hardness when stiffening the sealing material of this invention is raised, or a degree of hardness is lowered conversely and elongation after fracture can be taken out. The above-mentioned physical-properties regulator may be used independently, and may be used together two or more sorts.

[0105] Especially the compound that generates the compound which has a univalent silanol group in intramolecular by hydrolysis has the operation which reduces the modulus of a hardened material, without worsening stickiness of the front face of a hardened material. The compound which generates especially a trimethyl silanol is desirable. The compound indicated by JP.5-117521.A can be raised as a compound which generates the compound which has a univalent silanol group in intramolecular by hydrolysis. Moreover, the compound which generates the silicon compound which it is the derivative of alkyl alcohol, such as a hexanol, an octanol, and decanol, and the numbers of hydroxyl groups, such as a compound which generates the silicon compound which generates R3SiOH(s), such as a trimethyl silanol, by hydrolysis, trimethylol propane indicated by JP.11-241029.A, a glycerol, pentaerythritol, or a sorbitol, are the derivatives of three or more polyhydric alcohol, and generates R3SiOH(s), such as a trimethyl silanol, by hydrolysis can be raised.

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alcohol was esterified with the cinnamic acid, the Pori cinnamic-acid vinyl derivative of others many is illustrated. Azide-ized resin is known as a photopolymer which makes an azide radical a sensitization radical. Usually, a "photopolymer" (publication on March 17, Shows 47) besides [which added the diazo compound as a sensitization agent] rubber sensitization liquid printing society publication section issue, and the 93rd page - 106th page - 117th page - have detailed instantiation, and independent in these — or it can mix and can be used if needed, being able to add a sensitizer. In addition, addition of accelerators, such as sensitizers, such as ketones and a nitro compound, and amines, may heighten effectiveness.

[0111] The amount of the photoresist matter used has desirable 0.01 - 20 weight section to the polymer 100 weight section which has a reactant silicon radical, and further 0.5 - its 10 weight sections range are desirable. In below the 0.01 weight section, the effectiveness which raises weatherability is small, and since a hardened material becomes hard too much above 20 weight sections and a cracking crack is produced, it is not desirable.

[0112] The oxygen hardenability matter can be used for the constituent of this invention. To the oxygen hardenability matter, the unsaturated compound which can react can be illustrated as the oxygen in air, it reacts with the oxygen in air, a hardening coat is formed near the front face of a hardened material, and an operation of preventing adhesion of stickiness of a front face, the dust on the front face of a hardened material, and dust is carried out. The drying oil represented with tung oil, the linseed oil, etc. by the example of the oxygen hardenability matter. The various alkyl resins denaturalized and obtained in this compound; The acrylic polymer which denaturalized with drying oil. Epoxy system resin, silicon resin; A butadiene, a chloroprene, an isoprene, Diene series, such as 1,3-pentadiene, a polymerization or 1 which is made to carry out copolymerization and is obtained. 2-polybutadiene. Liquefied polymers, such as a polymer of 1, 4-polybutadiene, and C5 - C8 diene, NBR which is made to carry out copolymerization of these diene series and the monomers which have copolymeric, such as acrylonitrile and styrene, so that diene series may serve as a subject, and is obtained. Those various denaturation objects (a mallein-ized denaturation object, boiled oil denaturation object, etc.) are mentioned to liquefied copolymers, such as SBR, and a pan. These may be used independently and may be used together two or more sorts. Especially among these, tung oil and a liquefied diene system polymer are desirable. Moreover, concomitant use of the catalyst metallurgy group dryer which promotes an oxidation hardening reaction may heighten effectiveness. As these catalyst metallurgy group dryers, metal salts, such as naphthenic-acid cobalt, naphthenic-acid lead, a naphthenic-acid zirconium, octylic acid cobalt, and an octylic acid zirconium, an amine compound, etc. are illustrated. It is at best still more desirable to use it in the range of 0.1 - 20 weight section to the polymer 100 weight section which has a reactant silicon radical, and the amount of the oxygen hardenability matter used is 1 - 10 weight section. If the improvement of stain resistance becomes less enough when said amount used becomes under the 0.1 weight section, and 20 weight sections are surpassed, the inclination for the tractive characteristics of a hardened material etc. to be spoiled will arise. The oxygen hardenability matter is good to use it, using together with the photoresist matter as indicated by JP.3-160053.A.

[0113] An antioxidant (antioxidant) can be used for the constituent of this invention. If an antioxidant is used, the weatherability of a hardened material can be raised. Although a hindered phenol system, a mono-phenol system, a bisphenol system, and a polyphenol system can be illustrated as an anti-oxidant, especially a hindered phenol system is desirable. Similarly Tinuvin 622LD, tinuvin 144;CHIMASSORB944LD, CHIMASSORB119fluor-lineal are Ciba-Geigy Japan, Inc. make above)MARK LA-57 and MARK LA-62 and MARK LA-67 and MARK LA-63 and MARK LA-68(all are ADEKAAGASU chemistry incorporated company make above); SANORU LS-770, SANORU LS-765, SANORU LS-292, SANORU LS-2628, SANORU LS-1114, and the hindered amine light stabilizer shown in SANORU LS-744 (all are the Sankyo Co., Ltd. make above) can also be used. The example of an antioxidant is indicated by JP.4-283259.A and JP.9-194731.A. It is at best still more desirable to use it in the range of 0.1 - 10 weight section to the polymer 100 weight

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section which has a reactant silicon radical, and the amount of the antioxidant used is 0.2 - 5 weight section.

[0114]

Light stabilizer can be used for the sealing material of this invention. If light stabilizer is used, photooxidation degradation of a hardened material can be prevented. Although a benzotriazole system, a hindered amine system, a benzoate system compound, etc. can be illustrated as light stabilizer, especially a hindered amine system is desirable. It is at best still more desirable to use it in the range of 0.1 - 10 weight section to the polymer 100 weight section which has a reactant silicon radical, and the amount of the light stabilizer used is 0.2 - 5 weight section. The example of light stabilizer is indicated by JP.9-194731.A.

[0115]

When using the photoresist matter together to the sealing material of this invention and using especially a partial saturation acrylic compound, it is desirable to use a tertiary amine content hindered amine light stabilizer as a hindered amine light stabilizer as indicated by JP.5-70531.A because of preservation stability amelioration of a constituent. As a tertiary amine content hindered amine light stabilizer, light stabilizer, such as tinuvin 622LD, tinuvin 144, CHIMASSORB 119flow-line (all are Ciba-Geigy Japan, Inc. make above), MARKLA-57, LA-62, LA-67, LA-63 (all are ADEKAAGASU chemistry incorporated company make above), SANORU LS-765, LS-292, LS-2626, LS-1114, and LS-744 (all are the Sankyo Co., Ltd. make above), can be illustrated.

[0116]

An ultraviolet ray absorbent can be used for the sealing material of this invention. If an ultraviolet ray absorbent is used, the surface weatherability of a hardened material can be raised. Although a benzophenone system, a benzotriazole system, a salicylate series, a permutation tolyl system, a metal chelate system compound, etc. can be illustrated as an ultraviolet ray absorbent, especially a benzotriazole system is desirable. It is at best still more desirable to use it in the range of 0.1 - 10 weight section to the polymer 100 weight section which has a reactant silicon radical, and the amount of the ultraviolet ray absorbent used is 0.2 - 5 weight section. It is desirable to use together and use a phenol system, a hindered phenolic antioxidant, a hindered amine light stabilizer, and a benzotriazole system ultraviolet ray absorbent.

[0117]

An epoxy resin can be added in the sealing material of this invention, and it can also use for him as elastic adhesives etc. As an epoxy resin, an epichlorohydrin-bisphenol A mold epoxy resin, Fire-resistant mold epoxy resins, such as an epichlorohydrin-bisphenol female mold epoxy resin and glycidyl ether of tetrabromobisphenol A, A novolak mold epoxy resin, a hydrogenation bisphenol A mold epoxy resin. The glycidyl ether mold epoxy resin of a bisphenol A propylene oxide addition product, A proxy-benzoic-acid glycidyl ether ester mold epoxy resin, m-aminophenol system epoxy resin, A diamino diphenylmethane system epoxy resin, an urethane modified epoxy resin, Various cycloaliphatic-epoxy-resin, N, and N-diglycidyl aniline, N, and N-diglycidyl-ortho toluidine, Although triglycidyl isocyanurate, polyalkylene glycol diglycidyl ether, a glycerol, etc. solve, the glycidyl ether of polyhydric alcohol, a hydantoin mold epoxy resin, petroleum resin, etc. solve and the epoxidation object of a partial saturation polymer etc. is illustrated. Not the thing limited to these but the epoxy resin currently generally used is used, and it gets. What contains an epoxy group in [two] a molecule at least has high reactivity on the occasion of hardening, and a hardened material is desirable from points — it is easy to build a three-dimension-mesh. As a still more desirable thing, the bisphenol A mold epoxy resins or a novolak mold epoxy resin is raised. The range of the operating rate of a polymer of having these epoxy resins and a reactant silicon radical is a polymer / epoxy resin = 100 / 1 - 1/100 in a weight ratio. If the amelioration effectiveness of the impact strength of an epoxy resin hardened material or tough nature becomes will be hard to be acquired if the rate of a polymer/epoxy resin becomes less than 1/100 and the rate of a polymer/epoxy resin surpasses 100/1, the reinforcement of a polymer hardened material will become inadequate. Since a desirable operating rate changes with applications of a hardenability resin constituent etc., it does not generally have ***** but when improving the shock resistance of an epoxy resin hardened

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ketimines may be used independently, two or more kinds may be used together and used for them, 1-100 weight section use is carried out to the epoxy resin 100 weight section, and the amount used changes with classes of an epoxy resin and ketimine.

[0123]

In the sealing material of this invention, various additives may be added if needed for the purpose of adjustment of many physical properties of a sealing material or a hardened material. As an example of such an additive, a flame retarder, a hardenability regulator, radical inhibitor, a metal deactivator, anti-ozonant, the Lynn system peroxide decomposition agent, lubricant, a pigment, a foaming agent, a solvent, an antifungal agent, etc. are raised, for example. These various additives may be used independently and may use two or more kinds together.

[0124]

A primer can be used for this sealing material. By using a primer, a weathering adhesive property can be raised further. As a primer to be used, the thing of a silicon system is desirable.

[0125]

Moreover, addition of the compound which has three -COOCH(s) improves a sealing material's weathering adhesive property. This compound may be plasticizers, such as a diethyl horse mackerel peat.

[0126]

The sealing material of this invention does combination seal preservation of all the combination components beforehand, is possible also for preparing as one component type hardened with the moisture in after [construction] air, blends components, such as a curing catalyst, a filler, a plasticizer, and water, separately as a curing agent, and can also prepare as two component types mixed before using this compounding agent and a polymer constituent.

[0127]

Since all combination components are beforehand blended when said sealing material is one component type, as for the combination component containing moisture, it is desirable to use it, after carrying out dehydration desiccation beforehand, or to dehydrate with reduced pressure etc. during combination kneading. When said sealing materials are two component types, since it is not necessary to blend a curing catalyst with the base resin containing the polymer which has a reactant silicon radical, even if some moisture contains in the compounding agent, there are few worries about gelation, but when you need prolonged storage stability, it is desirable to carry out dehydration desiccation.

[0128]

In the case of solid state materials, such as powder, in the case of a drying method by heating and a liquefied object, as dehydration and the desiccation approach, the dehydrating method which used the reduced pressure dehydrating method or permutite, an activated alumina, silica gel, etc. is suitable. Moreover, little combination of the isocyanate compound may be carried out, an isocyanate radical and water may be made to react, and you may dehydrate. Storage stability improves further by adding alkoxysilane compounds, such as lower alcohol-propyltrimethoxysilane, such as a methanol and ethanol, vinyltrimethoxysilane, vinylmethyldimethoxysilane, gamma-mercaptopropylmethyl dimethoxysilane, gamma-mercaptopropylmethyl diethoxysilane, and gamma-glycidoxypropyltrimethoxysilane, in addition to this dehydration drying method.

[0129]

the polymer 100 weight section in which the amount of water, such as a dehydrating agent, especially vinyltrimethoxysilane, and the silicon compound used which can react has a reactant silicon radical — receiving — 0.1 - 20 weight section — the range of 0.5 - 10 weight section is preferably desirable.

[0130]

Especially the sealing material of this invention is useful as an elastic sealant, and can use it as seal agents, such as a building, a vessel, an automobile, and a road. In construction of a sealing material, a primer can be used if needed and the primer of a silicone system is desirable. In the case of a polyisobutylene system sealing material, especially the primer of a silicone system is desirable.

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material, flexibility, tough nature, peel strength, etc., for example, it is good the 1 - 100 weight section and to carry out 5-100 weight section use of the polymer still more preferably to the epoxy resin 100 weight section. It is good the 1 - 200 weight section and to, carry out 5-100 weight section use of the epoxy resin still more preferably to the (A) component *(B) component 100 weight section on the other hand, in improving the reinforcement of the hardened material of a polymer.

[0118]

When using an epoxy resin, naturally the curing agent which stiffens an epoxy resin can be used together. As an epoxy resin curing agent which can be used, there is especially no limit and it can use the epoxy resin curing agent currently generally used. Specifically For example, triethylenetetramine, tetraethylenepentamine, Diethylamino propylamine, N-aminoethyl piperidine, m-xylylene diamine, m-phenylenediamine, diamino diphenylmethane, diaminodiphenyl sulfone, The first classes, such as isophorone diamine and an amine end polyether, the second class amines: 2, 4, 6-tris (dimethyl aminomethyl) phenol, The third class amines like tripropylamine, and the salts: polyamide resin; imidazole-derivatives; dicyandiamides of these third class amines; Boron trifluoride complex compounds Phthalic anhydride, hexahydro phthalic anhydride, tetrahydro phthalic anhydride, Anhydrous carboxylic-acids; alcohols; phenols; carboxylic acids; DODESHINIRU succinyl oxide, pyromellitic dianhydride, and an anhydrous KUROREN acid; although compounds, such as a diketone complex compound of aluminum or a zirconium, can be illustrated, it is not limited to these. Moreover, a curing agent may also be independent or two or more sorts may be used together.

[0119]

When using the curing agent of an epoxy resin, the amount used is the range of the 0.1 - 300 weight section to the epoxy resin 100 weight section.

[0120]

Ketimine can be used as a curing agent of an epoxy resin. In the condition that ketimine does not have moisture, it exists in stability, and it is decomposed into primary amine and a ketone by moisture, and the produced primary amine serves as a curing agent of the room-temperature-curing nature of an epoxy resin. If ketimine is used, a liquid type constituent can be obtained. As such ketimine, it can obtain by the condensation reaction of an amine compound and a carbonyl compound.

[0121]

Although what is necessary is just to use a well-known amine compound and a carbonyl compound for composition of ketimine. As an amine compound, for example, ethylenediamine, propylenediamine, Trimethylene diamine, a tetramethylenediamine, 1, 3-diamino butane, 2, 3-diamino butane, pentamethylene diamine, 2, 4-diamino pentane, Diamines, such as hexamethylenediamine, p-phenylene diamine, p, and p'-biphenylene diamine; 1, 2, 3-triamino propane, Multiple-valued amines, such as triamino benzene, a tris (2-aminoethyl) amine, and tetrapod (aminomethyl) methane; Diethylenetetramine, Polyalkylene polyamine, such as TORRECHIREM triamine and tetraethylenepentamine; Polyoxoalkylene series polyamine; gamma-aminopropyl triethoxysilane, Amino silanes [such as N-(beta-aminoethyl)-gamma-aminopropyl trimethoxysilane and N-(beta-aminoethyl)-gamma-aminopropyl methyl dimethoxysilane,]; etc. is used, and it gets. As a carbonyl compound, moreover, an acetaldehyde, propionaldehyde, n-butyraldehyde, isobutyraldehyde, a diethyl acetaldehyde, Aldehydes, such as a glyoxal and a benzaldehyde; Cyclopentanone, Annular ketones, such as trimethyl cyclopentanone, a cyclohexanone, and a trimethyl cyclohexanone; An acetone, A methyl ethyl ketone, methyl propyl ketone, methyl isopropyl ketone, Methyl isobutyl ketone, a diethyl ketone, dipropyl ketone, disopropyl ketone, Aliphatic series ketones, such as a dibutyl ketone and disobutyl ketone; beta-dicarbonyl compound [such as an acetylacetone, methyl acetoacetate, an ethyl acetoacetate, dimethyl malonate, a diethyl malonate, a malonic-acid methylethyl, and dibenzoylmethane,]; etc. can be used.

[0122]

When an imino group exists in ketimine, an imino group may be made to react with glycidyl ether; glycidyl ester, such as styrene oxide; butyl glycidyl ether and allyl glycidyl ether, etc. Such

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[0131]

The approach of this invention can be used suitable also for opaque ingredients, such as a tile with which the photocatalyst layer which has an antifouling operation is prepared in the front face. Although mortar was mainly conventionally used for adhesion of a tile, in order to raise adhesion dependability in recent years, organic system adhesives came to be used for tile adhesion. The polymer of the acrylic which has the reactant silicon radical used for this invention, or a saturated hydrocarbon system can be used for tile adhesion.

[0132]

Usually, although adhesives are in contact with the tile in the rear face of a tile, a tile front face may be touched in the side face of a tile etc. In the case of the construction method does not bury a joint with the makeup mortar called *****less tiling, but also leaves adhesives to the joint part as it is, and made it the adhesives of a joint appear from the outside, a tile front face may be touched especially in the side face of a tile etc. Moreover, since the stress by telescopic motion of a tile is absorbed in the tile construction of a large area, although some places (especially head joint) of a joint may be filled up with an elastic sealing compound, in the side face of a tile etc., a sealing material may touch a tile front face also in this case. Moreover, sealing may be required for a tile front face.

[0133]

Thus, there is a problem from which adhesives and the sealing material which hardened contact on the surface of a tile, a tile front face will be polluted if the thing of a silicone system is used as adhesives or a sealing material when the photocatalyst layer which has an antifouling operation to a tile is prepared, and an antifouling operation of a photocatalyst layer is prevented. Moreover, if organic system adhesives and the sealing materials other than a silicone system are used, decomposition degradation may be carried out in an antifouling operation of a photocatalyst layer.

[0134]

If the polymer of the acrylic which has a reactant silicon radical here, or a saturated hydrocarbon system is used for a sealing material or adhesives, there will also be no contamination on the front face of a tile, and decomposition degradation will also be lost.

[Example]

[0135]

Although an example is shown below, this invention is not limited to the following example. The "weight section" and "% of the weight" are expressed the "section" and "%" among the following example and the example of a comparison, respectively. Moreover, pentamethyl diethylenetetramine was called "triamine" and "number average molecular weight" and "molecular weight distribution (ratio of weight average molecular weight and number average molecular weight)" were computed with the polystyrene conversion molecular weight which used gel permeation chromatography (GPC). However, chloroform was used as what was filled up with polyethylene bridge formation gel as a GPC column (shodex GPC K-804; Showa Denko K.K. make), and a GPC solvent. Moreover, the product made from pill KINTON (Pilkington) and active glass (Active Glass) which are sheet glass with which antifouling processing was carried out to the front face were used for the example and the example of a comparison.

[0136]

(Synthetic example 1)
After teaching CuBr (923.3g, 6.44 mols) to the reaction vessel of 250L with an agitator and carrying out the N2 seal of the inside of a reaction vessel to it, the acetonitrile (6871g) was added and it stirred for 15 minutes at 65 degrees C. Butyl acrylate (22.0kg), 2,5-dimethoxy adipic acid diethyl (1931.2 g, 5.38 mols), an acetonitrile (3000g), and triamine (44.8mL, 214.6mmol) were added to this, and the reaction was started. Butyl acrylate (88.0kg) was added continuously, carrying out heating stirring at 80 degrees C. Triamine (179.2mL, 859.5mmol) was added in the middle of dropping of butyl acrylate. By adding 1, 7-OKUTA diene (15.847kg), and triamine (872.0mL, 3.21 mols) after heating stirring at 80 degrees C successfully, and continuing heating stirring at 80 more degrees C for 10 hours, the reaction mixture containing a polymer was obtained and the alkenyl radical end polymer was obtained by carrying out reduced pressure

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transparent material by which antifouling processing was made is shown so that clearly from Table 1.

[0156]

(Examples 6-10, example 3 of a comparison)

The active glass (examples 6-10) on which the sealing material obtained by the same approach as examples 1-5 was pasted up was prepared. Moreover, the active glass (example 3 of a comparison) on which the sealing material obtained by the same approach as an example 1 as a sealing material using the silicone system sealing material (silicone sealant 1 made from the Shin-etsu chemistry component type "a sealant 45") was pasted up was prepared. These samples were turned southernward, and it received horizontally, and was left for three months to the outdoors in Takasago, Hyogo in the inclination of 30 degrees. Waterdrop was sprayed with the atomizer on the glass front face, and the condition of waterdrop was observed. With the glass of the example 3 of a comparison, waterdrop generated on the front face to water soaking a glass front face in the glass of examples 6-10, without waterdrop generating on a front face. A silicone system sealing material pollutes a glass front face with the glass of the example 3 of a comparison, the pollution-control effectiveness on the front face of glass decreases, and it is thought that waterdrop generates on a glass front face.

[0157]

In the following examples, using the same product made from pill KINTON (Pilkington) as the preceding clause, and active glass, the xenon weatherometer was used as accelerated weathering test equipment, and light was irradiated from the glass side which the sealing material has not pasted up. In addition, the black panel temperature of a xenon weatherometer is [180W/m², and the water spray of 63 degrees C and exposure energy] 18 minutes every 120 minutes.

[0158]

(Example 11)

The compound of an example 1 was used for the field where antifouling processing of glass was carried out, the test piece was created by the same approach as an example 1, and evaluation of a weathering adhesive property was performed. A result is shown in Table 2.

[0159]

(Example 12)

Using "APZ-6633" (Nippon Unicar make) which is a silicone resin primer, the compound of an example 1 was used, the test piece was created in the field where antifouling processing of glass was carried out by the same approach as an example 1, and evaluation of a weathering adhesive property was carried out to it. A result is shown in Table 2. Compared with an example 11, if silicon resin system primer APZ-6633 are used, a weathering adhesive property can be improved further.

[0160]

(Example 13)

Plasticizer DIDP combination number of copies of the compound of an example 1 was made into the 50 sections from the 60 sections, and the compound was created by the same approach as an example 1 except having blended the 10 sections (dimethyl horse mackerel peat; the Daihachi chemistry company make) of DMA as carboxylic-acid dimethyl ester further. Using the obtained compound, the test piece was created by the same approach as an example 1, and weathering adhesive property evaluation was performed. A result is shown in Table 2. When a dimethyl horse mackerel peat is used, it turns out that a weathering adhesive property is improvable.

[0161]

(Example 14) It changed to the plasticizer DIDP60 section of an example 1, and changed to the acrylic polymer system plasticizer ("UP1020" by Toagosei), and the compound was further created by the same approach as an example 1 except having blended the 10 sections (dimethyl horse mackerel peat; the Daihachi chemistry company make) of DMA. A result is shown in Table 2.

[0162]

(Example 15) Instead of the polymer (P1), the polymer (P3) was used and the compound was

created by the same approach as an example 1 except having made Plasticizer DIDP into the 80 sections. Using the obtained compound, the test piece was created by the same approach as an example 1, and weathering adhesive property evaluation was performed. A result is shown in Table 2. Compared with an example 11, when a methyl acrylate is copolymerized, it turns out that a weathering adhesive property is improvable.

[0163]

[Table 2]

例	シーリング材の種類	プライマーの有無	キシノンウエサースター照射後の耐候試験結果				
			0	500h	1000h	2000h	20%
実施例11	アクリル系	無	耐候試験	耐候試験	耐候試験	耐候試験	耐候試験
実施例12	アクリル系	有	耐候試験	耐候試験	耐候試験	耐候試験	耐候試験
実施例13	アクリル系	無	耐候試験	耐候試験	耐候試験	耐候試験	耐候試験
実施例14	アクリル系	無	耐候試験	耐候試験	耐候試験	耐候試験	耐候試験
実施例15	アクリル系	無	耐候試験	耐候試験	耐候試験	耐候試験	耐候試験